

METHOD AND SYSTEM FOR DETECTING RADIATION
INCORPORATING A HARDENED PHOTOCATHODE

ABSTRACT OF THE DISCLOSURE

5 A method for detecting radiation is disclosed. The
method comprises nine steps. Step one calls for forming
a detector having a photocathode (22) with a protective
layer (22c) of cesium, oxygen and fluorine; a
microchannel plate (MCP) (24); and an electron receiver
10 (26). Step two requires receiving radiation at the
photocathode (22). Step three provides for the
photocathode (22) discharging electrons (34) in response
to the received photons. In step four, the method
provides for accelerating discharged electrons (34) from
the photocathode (22) to the input face (24a) of the
microchannel plate (24). The next step calls for
receiving the electrons (34) at the input face (24a) of
15 the microchannel plate (24). Step six calls for
generating a cascade of secondary emission electrons (36)
in the microchannel plate (24) in response to the
received electrons (34). The seventh step calls for
emitting the secondary emission electrons (36) from the
20 output face (24b) of the microchannel plate (24). In the
eighth step, the method provides for receiving secondary
emission electrons (36) at the electron receiver (26).
The last step calls for producing an output
characteristic of the secondary emission electrons (36).

25 A device for detecting radiation is disclosed. The
device comprises a photocathode (22), a microchannel

plate (24) and an electron receiver (26). The photocathode (22) is operable to receive radiation on an input side (22a) and to discharge electrons (34) from its output side (22b) in response. The output side (22b) of the photocathode (22) has a protective layer (22c) comprising cesium, oxygen and fluorine. The microchannel plate (24) serves to receive electrons (34) on its input face (24a) from the photocathode (22), to produce a cascade of secondary emission electrons (36) and to discharge those electrons (36) from its output face (24b). The electron receiver (26) is operable to receive secondary emissions electrons (36) from the microchannel plate (24) and to produce an output characteristic of those electrons (36).

A method for manufacturing a hardened photocathode (22) is disclosed. The method comprises four steps. The first step requires forming a photocathode (22) having an input side (22a) for receiving radiation and an output side (22b) for discharging electrons. The second through fourth steps require exposing the output side of the photocathode (22b) to cesium, oxygen and fluorine respectively to form a protective layer (22c).